

Appl. No. 10/613,200
Examiner: Tran, Mai Huong C, Art Unit 2818
In response to the Office Action dated June 22, 2004

Date: September 15, 2004
Attorney Docket No. 10112411

AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims

Claim 1 (Currently amended): An organic device comprising:

- a substrate or a dielectric layer;
- a photoresist layer formed on the substrate or dielectric layer, wherein the photoresist layer is provided with a plurality of microgrooves having an alignment direction;
- an organic semiconducting layer having alignment formed on the photoresist layer, wherein the organic semiconducting layer aligns according to the alignment direction of the microgrooves of the photoresist layer; and
- an electrode, wherein the plurality of microgrooves are located in different regions of the substrate, and wherein the microgrooves in the same region have the same alignment direction and the microgrooves in different regions have the same or different alignment directions.

Claim 2 (Canceled)

Claim 3 (Currently amended): The organic device as claimed in claim [[2]] 1, wherein

the plurality of microgrooves include first microgrooves aligned according to a first direction in a first region and second microgrooves aligned according to a second direction in a second region, wherein the first and second directions are different; and

the electrode includes a source and drain, wherein the source and drain are in contact with the organic semiconducting layer to form a channel between the source and drain, wherein the organic semiconducting layer in the channel region aligns according to the first direction and the organic semiconducting layer in the non-channel region aligns according to the second direction.

Claim 4 (Original): The organic device as claimed in claim 1, which is a top-gate type transistor and comprises:

- a substrate;

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a photoresist layer formed on the substrate, wherein the photoresist layer is provided with a plurality of microgrooves having an alignment direction;

an organic semiconducting layer having alignment formed on the photoresist layer, wherein the organic semiconducting layer aligns according to the alignment direction of the microgrooves of the photoresist layer; and

a source and a drain formed on the organic semiconducting layer to form a channel between the source and drain, wherein the channel has a channel direction the same as the alignment direction of the microgrooves;

a dielectric layer formed on the organic semiconducting layer, the source, and drain; and
a gate formed on the dielectric layer.

Claim 5 (Original): The organic device as claimed in claim 1, which is a top-gate type transistor and comprises:

a substrate;

a photoresist layer formed on the substrate, wherein the photoresist layer is provided with a plurality of microgrooves having an alignment direction;

a source and a drain formed on the photoresist layer and being in contact with the microgrooves of the photoresist layer respectively;

an organic semiconducting layer having alignment formed on the photoresist layer, the source, and the drain, wherein the organic semiconducting layer aligns according to the alignment direction of the microgrooves of the photoresist layer, such that a channel is formed between the source and drain and the channel has a channel direction the same as the alignment direction of the microgrooves;

a dielectric layer formed on the organic semiconducting layer; and
a gate formed on the dielectric layer.

Claim 6 (Original): The organic device as claimed in claim 1, which is a bottom-gate type transistor and comprises:

a substrate;

a gate formed on the substrate;

a photoresist layer formed on the gate, wherein the photoresist layer is provided with a plurality of microgrooves having an alignment direction;

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an organic semiconducting layer having alignment formed on the photoresist layer, wherein the organic semiconducting layer aligns according to the alignment direction of the microgrooves of the photoresist layer; and

a source and a drain formed on the organic semiconducting layer to form a channel between the source and drain, wherein the channel has a channel direction the same as the alignment direction of the microgrooves.

Claim 7 (Original): The organic device as claimed in claim 6, further comprising a dielectric layer formed between the gate and the photoresist layer.

Claim 8 (Original): The organic device as claimed in claim 1, which is a bottom-gate type transistor and comprises:

a substrate;

a gate formed on the substrate;

a photoresist layer formed on the gate, the photoresist layer is provided with a plurality of microgrooves having an alignment direction;

a source and a drain formed on the photoresist layer and being in contact with the microgrooves of the photoresist layer respectively; and

an organic semiconducting layer having alignment formed on the photoresist layer, the source, and the drain, wherein the organic semiconducting layer aligns according to the alignment direction of the microgrooves of the photoresist layer, such that a channel is formed between the source and drain and the channel has a channel direction the same as the alignment direction of the microgrooves.

Claim 9 (Original): The organic device as claimed in claim 8, further comprising a dielectric layer formed between the gate and the photoresist layer.

Claim 10 (Original): The organic device as claimed in claim 1, wherein the microgrooves have a depth of 0.3 μm to 1 μm .

Claim 11 (Original): The organic device as claimed in claim 1,, wherein the microgrooves have a width pitch of 0.5 μm to 2 μm .

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Claim 12 (Original): The organic device as claimed in claim 1, wherein the substrate is a silicon wafer, glass, quartz, a plastic substrate, or a flexible substrate.

Claim 13 (Original): The organic device as claimed in claim 1, wherein the dielectric layer has a dielectric constant higher than 3.

Claim 14 (Original): The organic device as claimed in claim 13, wherein the dielectric layer is inorganic material or polymer material.

Claim 15-36 (canceled)